



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,708	01/28/2002	Kay Hellig	1458.TT4978	7368

34456 7590 02/22/2005

TOLER & LARSON & ABEL L.L.P.
5000 PLAZA ON THE LAKE STE 265
AUSTIN, TX 78746

EXAMINER

GUERRERO, MARIA F

ART UNIT	PAPER NUMBER
----------	--------------

2822

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/058,708

Applicant(s)

HELLIG ET AL.

Examiner

Maria Guerrero

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 18-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 and 33 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-13, 19-25 and 27-32 is/are rejected.
- 7) ☒ Claim(s) 8 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to the Election filed January 25, 2005. The finality of the office action mailed December 8, 2004 has been withdrawn.

Status of Claims

2. Claims 14-17 are canceled. Claims 1-13 and 18-33 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 4-5, 7, 19, 22-23, 25 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. (US 6,614,079).

Lee et al. shows forming a gate structure (16) on a substrate (10); forming a dielectric spacer layer (nitride layer) over the semiconductor substrate and etching the dielectric layer without the use of a sacrificial forming spacer, to form L-shaped spacers (22)(Fig. 2C-2D, col. 7, lines 10-14, col. 8, lines 7-22). Lee et al. discloses the L-shaped spacers including a first L-shaped spacer adjacent to a first sidewall of the gate structure and a second L-shaped spacer adjacent to a first sidewall of the gate structure

(Fig. 2D). Lee et al. teaches the dielectric spacer layer (nitride layer) thickness being from about 30 to about 500 angstroms (col. 7, lines 14-18). Lee et al. shows anisotropically etching the dielectric spacer layer to form L-shaped spacers having vertical and horizontal portions varying in thickness (Fig. 2C-2D, col. 8, lines 7-22).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 2-3 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,614,079) in view of Haskell (US 4,818,714).

Lee et al. does not specifically show forming a liner oxide over the gate structure. However, Haskell discloses forming a liner oxide (50) on the gate structure (30) (Fig. 4-

5, col. 8, lines 40-62). In regards to thickness ranges, these values would be optimized through routine experimentation because there is not evidence of criticality. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Lee et al. reference by forming the liner oxide as taught by Haskell in order to provide an excellent conformal passivation layer for the gate structure.

5. Claims 9-13 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,614,079) in view of Nishizawa (US 6,613,686).

Lee et al. does not specifically show etching the dielectric spacer layer with a chemistry combination of CH₃F and O₂ with an inert gas. However, Nishizawa discloses etching silicon nitride using a chemistry combination of CH₃F and O₂ with an inert gas (Fig. 2 and 4, column 6, line 30 to column 7, line 50). In regards to parameter ranges, these values would be optimized through routine experimentation because there is not evidence of criticality. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Lee et al. reference by etching the dielectric spacer layer using the etch chemistry combination of CH₃F and O₂ with an inert gas as taught by Nishizawa in order to obtain better etch selectivity.

6. Claims 6 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,614,079) in view of Verma (US 5,716,880).

Lee et al. does not specifically the dielectric spacer layer being silicon oxynitride. However, Verma discloses the spacers being made from a variety of materials including silicon oxide, silicon nitride and silicon oxynitride (col. 9, lines 35-65)

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Lee et al. reference by including the use of silicon oxynitride to form the dielectric spacer layer as taught by Verma because silicon nitride and silicon oxynitride are interchangeably used in semiconductor fabrication.

Allowable Subject Matter

7. Claims 8 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 18 and 33 are allowed.

Response to Arguments

8. Applicant's arguments with respect to claims 1-7, 9-13, 19-25, and 27-32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

February 16, 2005

Maria F. Guerrero
MARIA F. GUERRERO
PRIMARY EXAMINER